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Remarks

This Amendment is responsive to the July 5, 2006 Office Action. Reexamination and reconsideration of claims 21-28 is respectfully requested.

Summary of The Office Action

Claims 21, 22, 23, 24, 25 and 28 were explicitly rejected under 35 U.S.C. §103(a) as being unpatentable over Rumbut. Claim 27 also appears to be implicitly rejected under 35 U.S.C. §103(a) as being unpatentable over Rumbut since a rationale is provided to that effect, though no explicit rejection appears.

Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over Quernemoen (US Pat. No. 6,453,169)(Quernemoen) in view of Rumbut. US Pat. No. 6,453,169 was issued to Maloney and concerns a radiotelephone. Applicant assumes that a simple typographic error has occurred and that the Office Action intended to recite US Pat. No. 6,453,269, which was issued to Quernemoen.

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The Claims Patentably Distinguish Over the References of Record

35 U.S.C. §103

To establish a prima facie case of 35 U.S.C. §103 obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. MPEP 2143.01 Second, there must be a reasonable expectation of success. MPEP 2143.02 Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143.03 Additionally, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaack, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). This requirement is intended to prevent unacceptable "hindsight reconstruction" where Applicant's invention is recreated from references using the Application as a blueprint. Furthermore, an Office Action must be very wary of taking "Official Notice" concerning what would have been obvious, especially when hindsight reconstruction is being performed. Additionally, non-analogous art references are not to be employed.

Here, neither the first nor the third criteria described in MPEP 2143 are satisfied since the combination of references does not teach or suggest all the claim limitations. None of the references, alone and/or in combination, teach a system having a detachably connected liquid cooling module. Thus, none of the claims are obvious for at least this reason. Additionally, Official Notice of what would have been obvious has been injudiciously applied rendering the obviousness rejections improper. Furthermore, Quernemoen is an invalid reference since it fails the non-analogous arts test.

The references do not teach a liquid cooled modular electronics system that includes a **detachably connectable** liquid cooling module(s). Rumbut describes a cabinet 200 into which liquid cooled modules may be placed. A cabinet is not a rack. Rumbut illustrates an external liquid cooling component 250 that is integrated (e.g., permanently, not detachably connected) into the cabinet 200. Component 250 is not illustrated being detachably connected to the cabinet 200. Additionally, component 250 is not illustrated as being mountable in cabinet 200 as claimed. Thus, the reference illustrates an example of a conventional cooling system that has a

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fixed cooling capacity and to which additional liquid cooling components cannot be readily added.

The Office Action agrees that Rumbut does not teach that the illustrated "connectors" (212, 218) are configured to provide detachable connections but could be reconfigured to do so. However, the "connectors" identified by the Office Action are not even connectors. The Office Action asserts that the "ends of elements 212 and 218" are connectors. Element 212 appears to be a continuous pipe that is permanently attached to pump 250 and to cabinet 200. Similarly, element 218 appears to be a continuous pipe that is permanently attached to pump 250 and to cabinet 200. Thus, Rumbut describes a conventional system that does not have easily removable cooling modules. There appears to have been absolutely no thought in Rumbut to making pump 250 anything but a permanent fixture with cabinet 200. There is no teaching or motivation in the reference that pump 250 is anything but a permanent fixture.

The Office Action identifies benefits and advantages of being able to do what cannot be done with the permanent integrated assembly of 250, 212, 200, and 218 and then asserts that it would be obvious to reconfigure some of these elements to gain these advantages. This appears to be inadmissible hindsight reconstruction based on Official Notice, particularly since the Office Action provides no citation to any portion of Rumbut that teaches the desirability of the reconfiguration and provides no citation to any portion of Rumbut that provides any motivation for the reconfiguration. Indeed, the rationale for the rejection reads more like Reasons for Allowance than rationale for rejection.

The Office Action asserts that Rumbut Figs. 1 and 2 show that the electronics module is detachably connected by screws and threads. Thus, Rumbut must have been aware of how to create this type of connection. However, Rumbut chose not to do so with respect to the cooling module 250. It is improper hindsight reconstruction based on Official Notice for the Office Action to now do what no inventor, particularly Rumbut, chose to do at the time of the invention.

Official Notice

MPEP §2144.03 speaks directly to "Official Notice". This section counsels that only "in limited circumstances is it appropriate for an examiner to take official notice of facts not in the record or to rely on 'common knowledge' in making a rejection." MPEP §2144.03 There is nothing in the record that indicates that pipes 212 and 218, which are permanently connected to

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pump 250, should be cut (e.g., with a hacksaw) so that the screws and threads of 109 and 118 could be retrofitted onto all of 212, 218, and 250. Indeed, Rumbut appears to counsel against this type of tampering when it recites that it "is important that the integrity of the entire coolant distribution system be maintained for several reasons." (C3, 1156,57).

The MPEP specifically warns that Official Notice "rejections should be judiciously applied." MPEP §2144.03 Applying "Official Notice" to reject every single claim is not "judiciously applying" this technique. For this additional reason all the obviousness rejections are improper and should be removed.

Hindsight Reconstruction

Applicant will now comment on the propriety of modifying and combining the references in the manner performed in the Office Action. This appears to be hindsight reconstruction where the Office Action is using the Application as a blueprint to find parts of the claimed invention in unrelated references, one of which is non-analogous art. Hindsight reconstruction has long been frowned upon:

A rejection based on section 103 clearly must rest on a factual basis, and these facts must be interpreted without **hindsight reconstruction** of the invention from the prior art. In making this evaluation, all facts must be considered. The Patent Office has the initial duty of supplying the factual basis for its rejection. It may not, because it may doubt that the invention is patentable, resort to speculation, unfounded assumptions or **hindsight reconstruction** to supply deficiencies in its factual basis. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968) (emphases in original).

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). MPEP 2143.01

The hindsight reconstruction engaged in by the Office Action is impermissible since nothing in the prior art or the references suggests the desirability of combining the environmentally controlled circuit pack and cabinet of Rumbut with the computer program for comparing computer systems of Quernemoen. For this additional reason, the rejection of claim 26 is improper.

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Non-Analogous Art

MPEP 2141.01(a) "Analogous and Non Analogous Art", section I states:

In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." In re Oetiker, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992).

Here, the Office Action relies on Quernemoen, which is a "method of comparison for computer systems". (Title) More specifically, Quernemoen concerns "a computerized method that aids in the comparison of different computer systems according to their performance parameters under established or proprietary benchmark performance tables or databases". (Abstract) This is clearly not in the field of applicant's endeavor (cooling) or reasonably pertinent to the particular problem with which the inventor was concerned (e.g., providing easily configurable cooling solutions). Thus Quernemoen is not a valid reference to apply in the rejection of claim 26.

Claims will now be discussed individually.

Independent Claim 21

Claim 21 was rejected under 35 U.S.C. §103(a) as being anticipated by Rumbut. Claim 21 is directed to a liquid cooled modular electronics system that includes a sealed electronics module(s) and a **detachably connected** liquid cooling module(s). Separating an electronics module from a cooling module allows the two to be designed separately. See, for example, paragraph 54 which reads; "the electronics module 500 can be designed independently of the cooling module 510." In Rumbut, pack 100 can not be designed independent of cabinet 200 or pump 250 because all of the cooling available to cabinet 200 is provided by pump 250. Pack 100 could easily require more cooling than could be provided by pump 250 and thus not be able to be positioned in cabinet 200. This design issue can be mitigated using the detachably connectable liquid cooling modules claimed and described.

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The Office Action admits that Rumbut does not disclose a detachably connected liquid cooling module(s). The reference discloses a cabinet 200 that may house electronics modules (e.g., pack 100). The electronics module may be cooled by liquid provided by integrated pump 250. This is practically identical to the conventional system described in Figure 2 of the application where a computing system is connected to a cooling system.

Concerning the liquid cooling module being detachably connected, the Office Action identifies elements 212 and 218 as being connectors that could be reworked to provide the claimed detachable feature. However, the application defines "detachable connection" as:

[a] "detachable connection", or a connection by which entities may be "detachably connected", is one that facilitates attaching and detaching a first entity to a second entity. For example, a hose that is screwed onto a spigot is detachably connected. Similarly, an electrical receptacle configured to receive an electrical plug provides a detachable connection for the plug.

Elements 212 and 218 are not connectors, they are pipes that are permanently integrated into a pump 250 and cabinet 200 assembly. Elements 212 and 218 are not "detachable" as defined and claimed due to this integration. There appears to be no way to disconnect either 212 or 218 from either 250 or 200 without using a hacksaw. Thus these elements do not anticipate a "detachable connection" that facilitates logically decoupling liquid cooled modules, liquid cooling modules, and the supporting structure (e.g., rack) into which the cooled modules and cooling modules can be placed.

On page 6 the Office Action asserts that :

[d]etachable connections are well known in the art, and come in a variety of configurations, Figure 1 and Figure 2 of Rumbut show that the sealed electronics module are detachably connected by the use of threads and screws. It would have been obvious to one of ordinary skill in the art at the time of the invention to make the connectors configured to provide one or more detachable connections between the liquid cooling module and the liquid transporting means, using the configuration taught by Rumbut in Fig. 1 and Fig. 2.

Yet the Office Action provides no citation to any portion of the reference that suggests the desirability of this modification or that provides any motivation to do so. As described above, the motivation to modify must come from the reference, not from the application, from

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Official Notice, or from hindsight reconstruction. The Office Action provides its own motive when it identifies that hacking pipes 212 and 218 off pump 250 and cabinet 200 would “allow the liquid cooling module to be easily removed and fixed or replaced with out the need to replace the entire set up.” But this motive does not come from Rumbut, which teaches a single cabinet with a single cooling module permanently attached. Indeed, it appears that the Office Action has identified reasons for patentability rather than reasons for an obviousness rejection.

The Office Action also identifies element 103 (Figure 1) as teaching the claimed “means arranged within the liquid cooling module for providing the cooled liquid to one or more sealed electronic modules.” This is internally inconsistent since element 103 is located in what the Office Action describes as the sealed electronics module 100, not in the liquid cooling module (250). Thus, the reference does not teach this element.

Rumbut also fails to teach that “the one or more liquid cooling modules and the one or more sealed electronics modules ... can be selectively connected together” as claimed. In Rumbut, the pump 250 is permanently and non-selectively connected to cabinet 200. For this additional reason the claim is not obvious and is in condition for allowance.

Since claim 21 recites features not taught or suggested by the reference, claim 21 patentably distinguishes over the reference and is in condition for allowance.

Dependent Claims 22, 23, 24, 25, 26, and 28

These claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Rumbut. These claims depend from claim 21, which has been shown to be not obvious. Accordingly, these dependent claims are also not obvious and are in condition for allowance.

Claim 22

Claim 22 depends from claim 21. Claim 21 has been shown to be not obvious and thus this claim is similarly not obvious and is allowable. Additionally, claim 22 recites that sealed electronics modules can be **dynamically operably connected** to second liquid cooled electronics modules. The Office Action asserts that two or more electronic modules are **connected** by elements 209 and 212. However, simply connecting the two modules using pipes 209 and 212 does not leave the two modules “operably connected” as claimed. The application defines “operably connected” as meaning:

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An "operable connection", or a connection by which entities are "operably connected", is one in which signals, physical communication flow, and/or logical communication flow may be sent and/or received. Typically, an operable connection includes a physical interface, an electrical interface, and/or a data interface, but it is to be noted that an operable connection may include differing combinations of these or other types of connections sufficient to allow operable control.

Elements 209 and 212 are plumbing components that facilitate moving liquid. While the Office Action is correct that fluid may flow through two modules in a path that includes elements 209 and 212, this fluid flow would be insufficient to produce operable control. Thus, the liquid interface produced by elements 209 and 212 does not "operably connect" two electronics modules because no "operable control" is provided. For this additional reason this claim is not obvious and is in condition for allowance.

Claim 23

Claim 23 depends from claim 21. Claim 21 has been shown to be not obvious and thus this claim is similarly not obvious and is allowable. Additionally, claim 23 recites that sealed electronics modules are "sealed with respect to electromagnetic interference."

The Office Action asserts that electronic modules are sealed since claim 4 recites that "the sealable enclosure is fabricated with an electrostatic and electromagnetic shielding material". However, shielding cabinet 200 does not teaching sealing a module as claimed. If the claim read "positioning an electronics module in a cabinet that includes shielding material" then Rumbut claim 4 would be relevant to rejected claim 23. However, claim 23 clearly refers to the "electronics modules" being sealed, not the cabinet in which they reside. For this additional reason this claim is not obvious and is in condition for allowance.

Claim 27

Claim 27 depends from claim 21. Claim 21 has been shown to be not obvious. Thus, this claim is similarly not obvious and is allowable. Additionally, claim 27 recites that the liquid cooled modular electronics system includes a rack configured to mount sealed electronics modules and liquid cooling modules. Thus, both the electronics modules and the cooling modules could be housed in the same rack. See, for example, paragraph 34, which reads: "with

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the detachable connections, the electronics module 300 and the cooling module 310 may be repositioned in the rack.” Rumbut describes a cabinet into which electronics modules may be placed. Claim 27 goes a step further, allowing both electronics modules and cooling modules to be positioned in a rack.

The Office Action identifies cabinet 200 as being a rack. The reference reads that “the invention is a cabinet with enclosures for holding one or more circuit packs.” (C2, 1110-11). The reference also reads that “[c]ircuit board cabinet 200 is an exterior housing having a plurality of slots 203.” The Office Action relies on the circuit board cabinet 200 to provide “electrostatic and electromagnetic shielding material” (claim 4) when it rejects claim 23. The Office Action can not have it both ways. Either the cabinet 200 is a rack, in which case it can not possibly seal the electronics modules from electromagnetic interference, or it is a cabinet, in which case it can not serve as the “rack” of claim 27. Thus, to be internally consistent, the Office Action must remove at least one of the rejections of claim 27 and claim 23.

The Office Action appears to assert that cabinet 200 can house pump 250. While cabinet 200 can clearly mount packs 100 it is unclear how cabinet 200 could mount pump 250. Indeed, from the figures and description, it appears impossible to disconnect pump 250 and insert it into cabinet 200. For this additional reason this claim is not obvious and is allowable.

Claim 28

Claim 28 depends from claim 21. Claim 21 has been shown to be not obvious. Thus, this claim is similarly not obvious and is in condition for allowance. Additionally, claim 28 recites that the electronics system includes one or more liquid cooling modules arranged in a redundant, fail-over system.

Rumbut describes only a single cooling module 250. The Office Action asserts that adding a failover system to cabinet 200 would be obvious. All that would be required would be to dismantle the current system, add another pump 250, add additional plumbing to the new pump 250, add control logic to perform the failover processing, and add additional plumbing to prevent backflow, vapor lock, and so on. Yet the Office Action provides no citation to any portion of Rumbut that provides any motivation for performing any of this work. Once again, the recited motive to combine must be found in the reference, not in the Examiner’s own Official

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Notice. Thus, this rejection is improper and should be removed, leaving this claim not obvious and in condition for allowance.

Claim 26

Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over Quernemoen (US Pat. No. 6,453,169)(Quernemoen) in view of Rumbut. US Pat. No. 6,453,169 was issued to Maloney and concerns a radiotelephone. Applicant assumes that a simple typographic error has occurred and that the Office Action intended to recite US Pat. No. 6,453,269, which was issued to Quernemoen.


Claim 26 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 26 recites that the electronics system is a scaleable M processor server. Quernemoen describes a scaleable server 22. However, the Office Action provides no citation to any portion of Rumbut or Quernemoen describing why these two references should be combined. It appears that the Office Action has performed a keyword search for a reference that describes a "scaleable server" and tacked it on to Rumbut using hindsight reconstruction and official notice of what would be obvious. Unfortunately for the Office Action Quernemoen is non-analogous art as described above and thus is an invalid reference. The Office Action has recited the benefits of combining these references, but once again these appear more like reasons for patentability than reasons for an obviousness rejection. For these additional reasons this rejection is improper and should be removed, leaving claim 26 not obvious and in condition for allowance.

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Conclusion

For the reasons set forth above, claims 21-28 patentably and unobviously distinguish over the references and are allowable. An early allowance of all claims is earnestly solicited.

Respectfully submitted,



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